

## SENSITIVITY OF AVOCADO ROOTSTOCKS TO *VERTICILLIUM* WILT

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Earlier articles in this series described the establishment of an experimental set-up in Israel's commercial avocado orchards<sup>1</sup> presented data from fruit-bearing orchards not planned on an experimental basis<sup>2</sup> and described the difference in sensitivity to inadequate soil aeration between different avocado root-stocks.<sup>3</sup>

Verticillium disease has appeared in Israeli avocado orchards for years — in fact, since avocado became a commercial crop and orchards became more widespread. In most cases the damage was so restricted and occasional that no need was felt to pay particular attention to it or seek ways to prevent the disease or fight its agent. In recent years, however, some orchards have shown much more serious damage, which may affect up to 20% of the trees in the orchard.

The symptoms of the disease observed here<sup>5</sup> are identical with those described by Marlatt and Goldweber in Florida<sup>6</sup> and Zentmyer and his colleagues in California<sup>7</sup>: The affected tree wilts suddenly, wholly or in part; for a long time, the wilted leaves remain on the tree; under the bark of the branches, brown stripes can be seen; after some time, the affected tree or branch puts out leaves again below the diseased area. The probability of the disease is highest when avocado is planted in areas formerly planted to vegetables sensitive to Verticillium, particularly Solanaceae; it is therefore recommended not to plant avocado on such land, but with the present large extent of planting it is hard to avoid areas which in the past were planted to Solanaceae.

Among the orchards seriously affected in recent years was one of those planned for rootstock-scion experiments, namely, the avocado orchard at Kefar Aza. Thus an opportunity was presented for studying the differences in sensitivity of different avocado rootstocks to *Verticillium*.

### **Description of Experiment**

The avocado orchard at Kefar Aza was planted in the autumn of 1969, in medium soil, in the Northwestern Negev. The lot was planted on an experimental basis according to a randomized block design and includes sub-experiments for the Fuerte, Hass and

Ettinger varieties. All the rootstocks of the lot are defined as West Indian, and were chosen with a view to local salinity conditions.

The Fuerte experiment includes three rootstock-scion combinations; each combination is represented by two trees in each of 40 blocks. The experiment involved the planting of a total of 80 trees of each combination.

The Ettinger experiment includes five rootstock-scion combinations in ten blocks, with the combinations represented by two or four trees in each block, and by 20 or 40 trees in the entire experiment.

No details of the Hass experiment will be given here, since no cases of *Verticillium* damage were found in this variety.

The development of the orchard was affected by many cases of Sun-Blotch virus, by chlorosis and by frost. *Verticillium* disease appeared in this orchard for the first time in Spring, 1972, and to a greater degree in Spring, 1973.

## Results

In June 1973, a survey was made of the trees and the number of trees affected by *Verticillium* between Spring 1972 and June 1973 was recorded. The results of the survey appear in Table 1.

TABLE 1: VULNERABILITY OF TREES TO *VERTICILLIUM*  
IN THE KEFAR AZA ORCHARD – SURVEY OF JUNE 1973

Strain	Scion	Rootstock	Number of trees surveyed	Number of trees affected by wilt	Percentage of trees affected by wilt
Fuerte	Barkai 27	Degania 12	69	10	14.5
	Barkai 27	Degania 90	74	1	1.3
	Barkai 2	Hall-Degania	67	1	1.5
Ettinger	Barkai 9	Degania 12	17	3	17.7
	Barkai 9	Degania 234	7	0	0
	Barkai 9	Peker 2	13	1	7.7
	Barkai 9	Degania 126	15	2	13.3
	Barkai 2	Ashdod 5	34	0	0

The rootstock Degani 12 is particularly sensitive to wilt, with both Fuerte and Ettinger. Sensitivity of Fuerte on other rootstocks is at the low rate of 1-2% found in many orchards. The reason for the greater than usual incidence in this orchard was the particularly high degree to which trees grafted on Degania 12 were affected. The figures for Ettinger are too low for us to draw conclusions. The Hass variety was not grafted on the sensitive rootstock — Degania 12 and that seems to be the reason that no cases of *Verticillium* appeared in this variety.

## Discussion and Conclusions

There appear to be considerable differences in the sensitivity of avocado rootstocks to *Verticillium* disease. The differences range from zero or low sensitivity (1-2%) — which in view of the regrowth of the tree does not require any particular treatment to a sensitivity of 15% and more, which amounts to severe damage to an orchard grafted on such rootstocks. The differences between the rootstocks warrant selection aimed at eliminating sensitive rootstocks in sensitive areas. Apparently, it will not be necessary to find a specific, particularly resistant rootstock, but it will be sufficient to reject particularly sensitive rootstocks. Differences in the sensitivity of avocado rootstocks to *Verticillium* have already been noted by Halma<sup>4</sup>, who found Mexican rootstocks more resistant than Guatemalan ones.

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## Summary

*Verticillium* wilt of avocado appeared in an orchard planted in 1969 as a planned experiment for comparing rootstock-scion combinations. A survey disclosed that one of the rootstocks is particularly sensitive to the disease, and that the main damage to the orchard occurred in trees on this rootstock. It was concluded that the degree of sensitivity to *Verticillium* is a subject for rootstock selection with the main purpose of negative selection of sensitive rootstocks.

## LITERATURE

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